

AD-A074 387

ARMY RUSSIAN INST APO NEW YORK 09053
LOGISTIC OF THE SOVIET ARMY. AN OVERVIEW. (U)
1979 T C CORNEIL

F/G 15/5

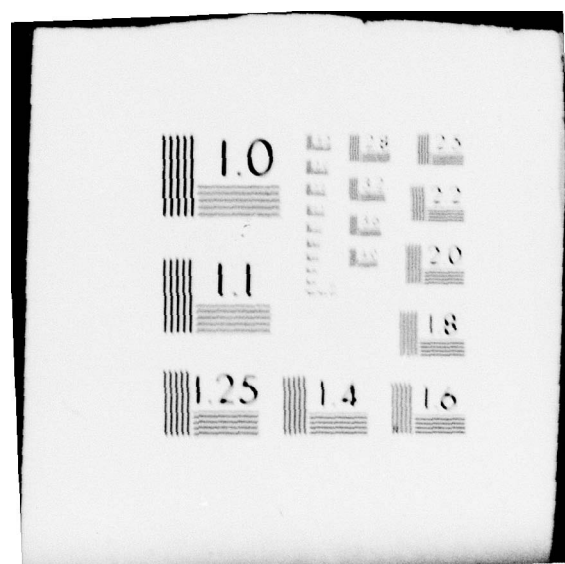
UNCLASSIFIED

NL

/ OF /
AD
A074387



END
DATE
FILMED
11-79
DDC



ADA 074387

LEVEL II
U.S. ARMY RUSSIAN INSTITUTE



11 1979

12 40p

DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

DDC FILE COPY

STUDENT RESEARCH REPORT

CPA TERRY C. CORNEIL

6 LOGISTICS OF THE SOVIET ARMY.
AN OVERVIEW.
-1979-

GARMISCH, GERMANY

APO NEW YORK 09053

DDC
RECEIVED
SEP 26 1979
A

4 11 079 79 09 17 056



DEPARTMENT OF THE ARMY
U. S. ARMY RUSSIAN INSTITUTE
APO NEW YORK 09053

8 June 1979

F O R E W O R D

This research project represents fulfillment of a student requirement for successful completion of the overseas phase of training of the Department of the Army's Foreign Area Officer Program (Russian).

Only unclassified sources are used in producing the research paper. The opinions, value judgements and conclusions expressed are those of the author and in no way reflect official policy of the United States Government, Department of Defense, Department of the Army, the US Army Intelligence and Security Command, or the Russian Institute. The completed paper is not to be reproduced in whole or in part without permission of the Commander, US Army Russian Institute, APO New York 09053.

Interested readers are invited to send their comments to the Commander of the Institute.


ROLAND LAJOIE
LTC, MI
Commanding

CLEARED
FOR OPEN PUBLICATION

JUL 25 1979 23

DIRECTORATE FOR FREEDOM OF INFORMATION
AND SECURITY REVIEW (OASD-PA)
DEPARTMENT OF DEFENSE

LOGISTICS OF THE SOVIET ARMY

AN OVERVIEW

Accession For	
NTIS GRA&I	<input checked="checked" type="checkbox"/>
DDC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By _____	
Distribution/	
Availability Codes	
Dist	Avail and/or special
A	

CPT. TERRY C. CORNEIL

1 May 1978

2104

A -

SUMMARY

While the majority of writings on the Soviet Army has dealt with their offensive war fighting capabilities, very little has been written on the ability of the Soviet Army to support and sustain combat operations. In this paper, the author analyzes the Soviet logistical system from three aspects: the formulation of logistical principles to support the Soviet Army's "Principles of War", the logistical organization of Soviet tactical units, and the Soviet logistical capabilities to provide adequate materiel and maintenance support. The author concludes that the Soviet rear services support the Soviet Army's principles of war and are tailored to insure a high degree of mobility and flexibility for combat support at the tactical level. According to the author, the Soviets have established a viable logistical system which reflects their recognition that inadequate logistical support can be a severely limiting factor in the successful conduct of a war.

↖

TABLE OF CONTENTS

1.	INTRODUCTION	i
2.	PRINCIPLES OF SOVIET LOGISTICS	1
	A. Mobility	1
	B. Advanced Creation and Echeloned Emplacement of Reserves	2
	C. Delivery Forward Concept	3
	D. Centralized Planning with a Firm Adherence to Priorities of Resupply	3
	E. Standardization of Equipment	4
	F. Utilization of All Forms of Transport and Captured Stock	5
3.	LOGISTICAL ORGANIZATION IN SOVIET TACTICAL UNITS	7
	A. Soviet Division	8
	B. Soviet Regiment	9
	C. Soviet Battalion	11
4.	LOGISTICAL CAPABILITIES - MATERIEL AND MAINTENANCE SUPPORT	13
	A. Supply Procedures	13
	B. Stockpiles, Dumps, and Depots	13
	C. Primary Logistical Vehicles	14
	D. Air Resupply	16
	E. Ammunition Resupply	16
	F. Fuel Resupply	17
	G. Tactical Pipelines	18
	H. Ration Resupply	19
	I. Medical Support	20
	J. Maintenance	21
5.	CONCLUSION	25
6.	FOOTNOTES	27
7.	BIBLIOGRAPHY	30

INTRODUCTION

The state of military art, tactics, and doctrine is a constant evolutionary process within all armed forces. Within the past thirty years, the Soviet Union has developed its ground forces in a manner commensurate with the belief that the next war will be conducted on a highly mobile, intense, nuclear battlefield. While the majority of writings on the Soviet Ground Forces has dealt with the offensive war fighting capabilities of the Soviet Army, very little has been written, especially in the West, on the Soviet Army's ability to support and resupply its massive armed forces in combat operations.

The purpose of this paper is to give a broad overview of the present-day organization of the Soviet Rear Service's logistical system (primarily at the tactical level) and discuss its capability to provide necessary support during wartime. This will naturally involve assessments of the strengths and weaknesses of the Soviet logistical system. One should be aware, however, that a weakness within the system does not necessarily mean that the entire system will not function during the war. Problems and weaknesses only constitute vulnerabilities if they are exploited by the enemy, either by direct battlefield intervention at the source of the problem, or by exacerbating the problem by indirect tactical pressures.

This overview of the logistics of the Soviet Army will be divided into three sections: Principles of Soviet Logistics, Logistical Organization in Soviet Tactical Units, and Soviet Logistical Capabilities-Materiel and Maintenance Support.

According to Soviet doctrine, each service operates under a framework of "principles" which act as guidelines for the formulation and execution of military operations. Each branch within a service has its own "principles" (tactics) which are supportive to the Service's operational principles.

In order to understand the basic organization of the Rear Services of the Soviet Army and their current procedure for the implementation of logistical support, it is first necessary to see how the Rear Services support the basic operational principles of the Soviet Army.

PRINCIPLES OF SOVIET LOGISTICS

Colonel V. Ye. Savkin in his book, The Basic Principles of Operational Art and Tactics, laid down seven basic principles for Soviet military operations. In the West these principles would roughly equate to "Principles of War". Summarized, the Principles of Operational Art and Tactics are:

1. Speed and Mobility
2. Concentration of Forces
3. Surprise
4. Combat Aggressiveness
5. Preservation of Combat Effectiveness
6. Conformity of Combat Goals with the Actual Situation
7. Coordination

The importance of these principles in the Soviet planning for war and the actual conduct of military operations cannot be overestimated. They act as guidelines, conscious or subconscious, for every Soviet officer.

Savkin's principles have necessarily influenced the operation and functioning of the Soviet rear services. The rear services have, in broad terms, established their own logistical principles which support one or more of Savkin's. They are as follows:

1. Mobility
2. Advanced Creation and Echeloned Emplacement of Reserves
3. Delivery Forward Concept
4. Centralized Planning with a Firm Adherence to Priorities of Resupply
5. Standardization of Equipment and Munitions
6. Utilization of All Forms of Transportation and Utilization of Captured Stock

With these "Rear Service Principles" acting as guidelines, the rear services of the Soviet Army are organized and equipped to function in a manner which enables them to operate within the framework of Savkin's basic principles of operational art and tactics.

Mobility

The rear service units at battalion, regiment, and division level are small, yet highly mobile. Christopher N. Donnelly of the Royal Military Academy at Sandhurst, England, likened the total fighting Soviet unit to a tadpole.¹ The first echelon of the tadpole comprises 2/3 of the teeth, the eyes and ears (i.e. reconnaissance units), and the brain (i.e. the commander). The second echelon is comprised of the muscle, whose job it is to exploit the successes of the first echelon and pursue into the depths

of the enemy's rear. The chief of staff and main headquarters elements have communications with higher units and constitute a form of central nervous system, controlling the organism in response to the brain's commands. The third echelon is the tail or the logistical elements. As Mr. Donnelly pointed out, the rear support elements slowly wither away as the combat situation progresses since it is constantly "feeding" the forward echelons. The rear normally maintains a five day supply of ammunition, fuel, and rations and is not dependent on resupply from higher units during the crucial initial stages of combat.

Since Soviet doctrine mandates that a fighting force be highly mobile and fast moving, the demands of mobility and speed are equally applicable to the rear. The Soviets have placed a great deal of emphasis on the development of highly mobile ground transportation. The majority of modern Soviet trucks have an "all wheel drive" capability and driver-regulated variable tire pressure which can be adjusted to suit the varying surface conditions.

The mission of every tactical unit (division level and below) is to successfully conduct combat operations against an enemy, and the "tail" of each unit is there to follow the fighting force as closely as possible to insure prompt resupply of needed ammunition, POL, rations, etc. Tactical rear services are not required to maintain highly vulnerable, time consuming, and cumbersome lines of resupply with higher units, but instead, only to insure that higher headquarters are informed of the unit's actual and projected resupply requirements. As will be pointed out later, it is higher headquarter's responsibility to insure the delivery of the supplies requisitioned by the subordinate units.

Advanced Creation and Echeloned Emplacement of Reserves

The second logistic principle of advanced creation and echeloned emplacement of reserves correlates with Savkin's principles of "Concentration of Forces" and "Surprise". By ensuring that well-stocked combat reserves are placed well forward and as close to the projected FEBA as possible, the ability to resupply a high speed, massive strike force is greatly enhanced.

The sudden movement of war supplies forward is generally considered to be a warning indicator of possible hostile action. However, if the war stocks are gradually moved forward during peacetime, this warning indicator will not be as apparent during the last minute preparations for offensive operations.

The Soviets have positioned their war reserves well forward and echeloned them in such a fashion as to insure that the army and front levels are able to maintain their resupply capabilities until the Soviet industrial complex can get on a "war footing".

According to Marshal V.D. Sokolovsky in Military Strategy, this is approximately a ninety day time frame.²

Fully realizing that the movement of war goods toward the front line is only one of many warning indicators, prepositioning stocks well forward allows a concentration of men and materiel and simultaneously reinforces the Soviet's capability to achieve surprise over their enemy.

Delivery Forward Concept

Savkin, in his discussion on the principle of "Aggressiveness", places primacy on the necessity of initiating, maintaining, and exploiting a war through offensive means. He states, "Activeness in combat operations presumes above all a seizing and holding of the initiative and imposing one's will on the enemy. This is achieved by the application of the most diverse methods of combat operations, the basis of which must be anticipation of the enemy in fire, in delivering forceful attacks and in executing maneuvers".³

Since Soviet tactics demand that combat battalions, regiments, and divisions be highly mobile and fast moving, the Soviets have designed their rear services to accommodate these factors. The rear services from division level on down have the mission of supplying and supporting their own organic needs and the requirements of their subordinate units. They do not have the tasks of procuring and transporting needed supplies from higher headquarters. These requirements are the responsibility of army and front level rear services where the bulk of logistic resources are located.

This enables tactical commanders to actively pursue offensive operations and relieves them of the burden of acquiring resupplies using their own organic assets. Since the resupply of tactical units is primarily performed by assets of the front and army, the delivery forward concept allows the senior commanders a great deal of flexibility in choosing which axis to support and which to abandon.

The delivery forward concept also supports the principle of "Preservation of Combat Effectiveness". Through centralized control at front and army level, the rear services can respond quickly to the needs of the tactical units involved in high intensity combat and can replenish, reorganize, and combine subordinate units as the tactical situation dictates.

Centralized Planning with a Firm Adherence to Priorities of Resupply

The centralized control of the rear services at front and army level has been considered by many Western military experts a princi-

ple strength of the Soviet logistical system. Through centralized control the Rear Services of the Soviet Army have established a priority system of resupply that is rigidly adhered to, and these priorities apply down to company level. The priorities of Soviet resupply are:⁴

1. Ammunition
2. POL
3. Technical Supplies
4. Rations and Clothing

It is evident that the prime concern of the Soviets is to maintain the war fighting capabilities of the tactical units, with the comfort of the troops a secondary consideration. By structuring their supply priorities in such a manner, the rear services help to insure the success of the combat missions of the engaged units.

Standardization of Equipment

Standardization of equipment is, at least indirectly, supportive of the principle of "Coordination". Savkin stresses that "success of contemporary combat operations may be achieved only through the joint efforts of all men and equipment participating in an operation or battle on the basis of their close and continuous interworking and the fullest use of combat capabilities".⁵ He elaborates further on the importance of coordination when he states, "Coordination must be based on mutual assistance and interchangeability of podrazdeleniye* and chast' of the combat arms, special troops, and also adjacent units in the interest of fulfillment of the combat mission assigned them".⁶ The key words from a logistical point of view are "means" and "interchangeability".

Historically, the Soviet doctrine of research and development has endeavored to upgrade existing weapon systems instead of implementing radical design changes. This has simplified maintenance procedures, stockage of repair parts, and cannibalization of outdated equipment. Beyond just the military context of R&D, much of the civilian transportation is of the same design as the military's, and the importance of this form of "standardization" between civilian and military assets will be discussed later.

The West has generally credited the Warsaw Pact with a high degree of standardization, since the Soviet Union is the primary supplier of weapons and weapon systems to the Pact. The advantages of having homogeneous weapon systems to logistically support are obvious. The complexity of maintenance and repair part/component part utilization is greatly reduced. Further, if the Warsaw Pact has the same systems

*Chast' is a Soviet term for any unit of regimental size.

Podrazdeleniye is a Soviet term which usually refers to a unit subordinate to a chast'.

to support throughout, the Soviet commanders have a great deal of flexibility in the attachment of Pact units to Soviet armies and vice-versa.

However, technology is now appearing to be an obstacle to standardization, especially within the non-Soviet Warsaw Pact (NSWP) armies. The Soviet allies have traditionally been the primary recipient of Soviet equipment which becomes outdated. Thus, non-Soviet Warsaw Pact armies have, for example, T-54/55 tanks as their main battle tank now that the Soviets have the T-72 as the replacement for the T-62 within the Soviet Army, and, in theory, the NSWP nations would be the recipients of the T-62's. However, "there appears to be some indications that some NSWP states are resisting this type of exchange, for they find the T-62 too expensive to purchase. Moreover, as more NSWP states begin to develop their own weapons the problem of standardization will become more difficult".⁷

It appears that the principle of "Standardization" is weakening within the Warsaw Pact as new weapon systems are developed. The "interchangeability" of the weapons and weapon systems within the Warsaw Pact may decline sharply and, in fact, prove to be a weakness in their ability to conduct joint combat operations. More analysis of the lack of Pact standardizations should be done to determine how best to exploit this situation.

Utilization of All Forms of Transport and Captured Stock

Based upon the experiences of WWII, the Soviet Army is well aware of the importance that civilian transportation can, and must, play in the support of a war. Much of the civilian transportation in the Soviet Union is of the same design as the organic transportation found in the Soviet Army, and is earmarked for mobilization and incorporation into the army's inventory if war should occur.⁸ The advantages of having a homogeneous civilian and military inventory of motor vehicles are that the requirement for training drivers on mobilized vehicles is drastically reduced, and the necessity of maintaining a separate stockage of repair parts in war reserve is virtually eliminated.

In the type of war the Soviets are prepared to wage, the possibility of overrunning and capturing enemy stocks is very high. The Soviets are prepared to maximize the usage of captured materiel, weapons, and POL. However, their logistical support planning factors are not dependent on the utilization of captured stocks, since this is a variable which may or may not take place. Any and all captured enemy supplies would be a "bonus" to the supply units and would merely increase their capabilities to support combat operations.

It is apparent that the rear services of the Soviet Army have endeavored to formulate and implement their own "tactics" which are supportive of the operational principles of the Soviet Army. It is now necessary to see how the Soviet Army has structured and tailored the logistical elements within the tactical units, and the function of some of the key logistical personnel.

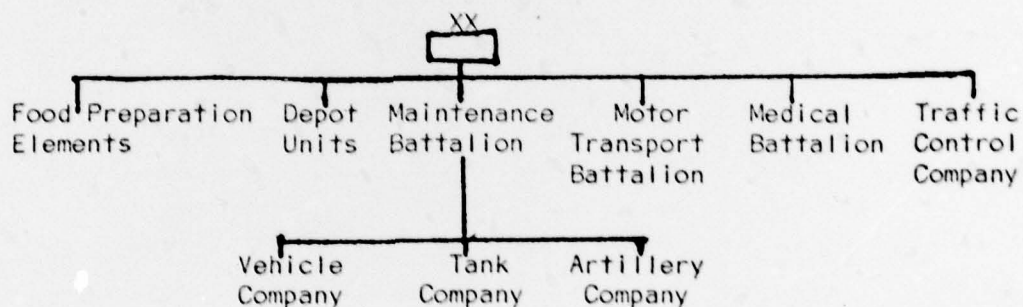
LOGISTICAL ORGANIZATION IN SOVIET TACTICAL UNITS

The Soviet logistical system in a theater of operations is divided into two categories: tactical (division and below) and operational (front and army). As previously indicated, the majority of logistical assets are located at the operational level, thereby insuring the mobility of the tactical logistic system (i.e. the highly mobile divisions are able to operate freely without being encumbered by slow moving organic supply vehicles).⁹

Since divisions and below are the primary maneuver elements of the Soviet Ground Forces, it is necessary to look at the composition of the logistical subunits and the respective staffing, and then one can begin to appreciate the "leanness" of the rear services in the tactical subunits.

Figure 1 *

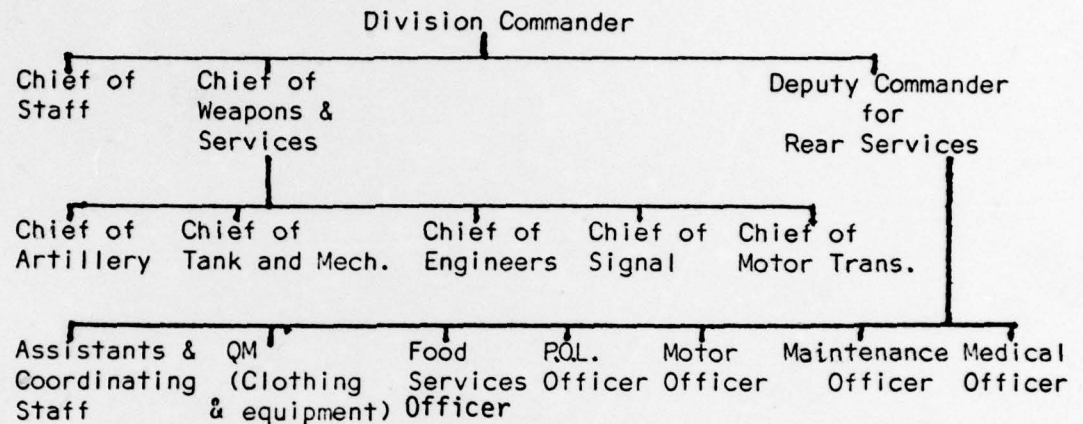
Logistic Units in a Soviet Tank Division



*Source: USAITD Report No. 14-U-76, Military Operations of the Soviet Army, Washington D.C., 1 September 1976.

Figure 2*

Key Logistic Personnel at Division HQ's



*Source: Speech delivered to the U.S. Army War College, April 1978 by Mr. Christopher N. Donnelly.

The overall responsibility for resupply of the subunits rests with the division commander. The deputy commander for rear Services is responsible for the overall procurement of equipment, food, medical supplies, and POL and is responsible for the actual movement of supplies to the subunits. The deputy commander of the rear is in charge of the smooth running of the entire rear area to include local defense, security, lines of communication, traffic control and handling of POW's. He works closely with the chief of staff in the daily planning of support operations.

The Soviet Army has established a logistic system whereby each chief of arms or service is responsible for the supply, maintenance, repair of weapons and equipment, and technical supplies unique to their respective arms or services. The supply responsibilities of each service are as follows:¹⁰

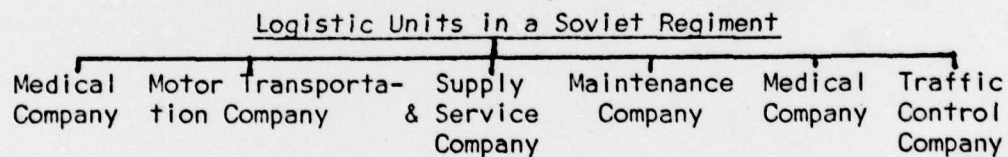
<u>Supplies</u>	<u>Responsible Directorate</u>
Artillery, small arms, and all types of munitions	Chief of Artillery
Combat Vehicles	Chief of Tanks and Mechanized Vehicles
Non-combat vehicles	Chief of Motor Transportation

(continued)

<u>Supplies</u>	<u>Responsible Directorate</u>
Engineer equipment	Chief of Engineers
Chemical equipment and supplies	Chief of Chemical Troops
Fuels and lubricants	Deputy Commander of Rear Services
Food, clothing, and equipment	Deputy Commander of Rear Services
Medical	Deputy Commander of Rear Services

These above specialized supply channels are only found at regimental and higher levels. At Division and regimental level, supplies are stored in a combined technical depot.

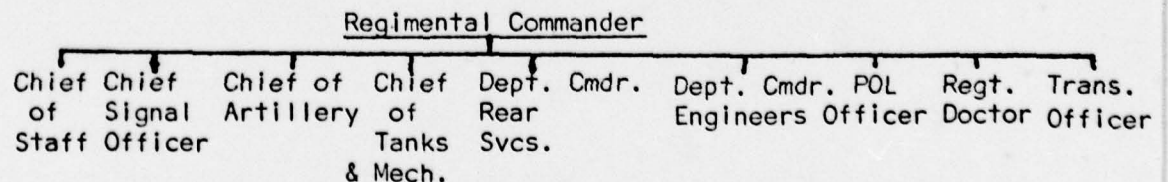
Figure 3*



*Source: USAITD Report No. 14-U-76, Military Operations of the Soviet Army, Washington D.C. 1 September 1976.

Figure 4*

Key Logistic Personnel at Regimental HQ's



*Source: Speech delivered by Mr. Christopher N. Donnelly to U.S. Army War College. April 1978.

The chief of artillery is responsible for the resupply of all ammunition, to include chemical and nuclear munitions. The chief of chemical troops requisitions the chemical munitions, but is not responsible for their transportation and dissemination, which is either an artillery or rear services function.

Even though the Soviet logistical system at regiment and division levels require that each arms or service chief be responsible for supplies unique to their respective branches, the role of the deputy commander of rear services still remains critical.

Soviet publications continually stress the importance of the deputy commander of rear services, and the role he plays in the successful completion of the combat mission. He must not only be a logistician, but also must have a broad appreciation of tactics and an ability to foresee the requirements of subordinate units based upon the developing combat situation. The deputy commander of rear services is actively involved in virtually every facet of the combat situation, as is reflected in the following statement:

"The deputy commander of rear services clarifies the mission based upon the estimates made by the commander or the chief of staff, and the preliminary instructions and orders for the rear issued by the senior chief (of rear services). In doing so, he studies the nature and goal of the battle, the depth of the combat missions, the width of the zone of attack, the regiment's role and place in the battle, the probable axis of concentration of the main efforts, and the probable combat formations of the regiment, and the time period of preparation for battle".¹¹

It appears that the deputy commander of rear services of the Soviet Army plays a much more active role during the conduct of combat operations than does his Western counterpart. In most Western armies, the S-4/G-4 would normally be located in the main body of the logistical tail. However, there are indications that Soviet tactics require the deputy commander of the rear services to be located closer to the battlefield. General-Major Ponamarev, a Soviet military district commander, stated that "Through the experience of training of the forces in our district, it is advisable that the deputy commander of rear services at the most critical moments not be located at the rear control point*, but at the command point* and operate there with the chief of artillery forces and the chief of fuel services. Such a group composition is able to interpret the importance of these types of support (i.e. ammunition resupply, fuel

*Rear Control Point - A control post organized to direct the rear services.

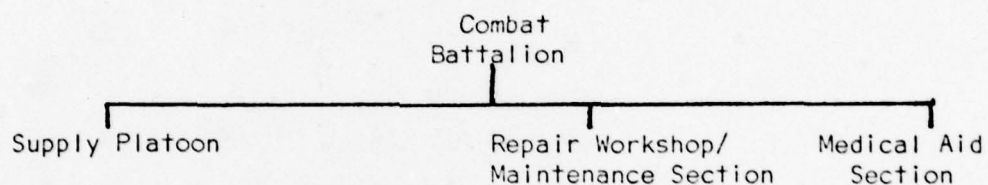
*Command Control Point - The main post for the control of troops in units, formations, and major field forces.

resupply, and vehicle repair/evacuation) and permits them to receive at the command point, not only the necessary information about the situation and demands of the subunits, but also to evaluate it, to make decisions and insofar as possible, in the form of instructions of the commander, keep the battalion commanders and commanders of other subunits informed".¹²

The deputy commander of rear services' location at the command point instead of at the rear control point indicates that he plays an integral part in the planning and execution of combat operations, more so than his Western counterparts.

Figure 5*

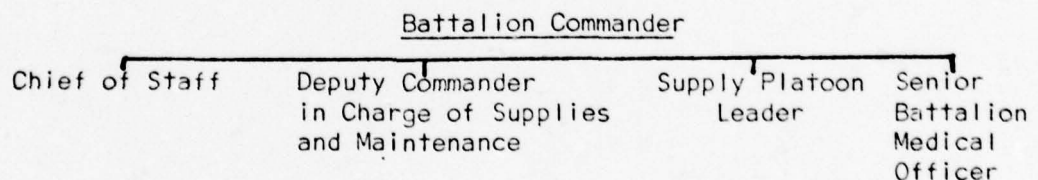
Logistic Units in a Soviet Battalion



*Source: Compiled from data contained in: I.I. Kushch, Tylovoye Obespecheniye Podrazdeleniye V Boyu (Rear Service Support for Subunits in Combat).

Figure 6*

Key Logistic Personnel at Battalion HQ's



*Source: Compiled from data contained in: I.I. Kushch, Tylovoye Obespecheniye Podrazdeleniye V Boyu (Rear Service Support for Subunits in Combat).

The rear of a motorized rifle or tank battalion consists of a supply platoon, a repair workshop (in a tank battalion it is a maintenance service section), and a medical aid station.

The supply platoon provides materiel to the subunits in the battalion. It consists of two squads - the motor vehicles squad and an administrative squad. The motor vehicle squad includes the drivers, trucks for ammunition and repair parts, and tanker trucks (fuel, oil, and water). The squad stores the ammunition at the battalion munition point, the fuel at the battalion fuel point, and the medical supplies with the battalion medical aid station. The squad makes every effort to support the companies directly.¹³

In the battalion, support is organized by the battalion commander, the chief of staff, the deputy commander in charge of supplies and maintenance, the supply platoon leader, and the chief paramedical officer. While the battalion commander has overall responsibility for rear services, the chief of staff is the primary organizer of battalion rear support. The deputy battalion commander in charge of supplies and maintenance directly supervises the supply of equipment in the battalion. He is responsible for the proper functioning, maintenance, and servicing of equipment, the proper use of armored vehicles, and training of maintenance personnel.¹⁴

The supply platoon leader organizes (in accordance with instructions from the battalion commander and the chief of staff) the reception of all materiel, the storage of battalion reserves, their delivery to the companies and the setting up of the ammunition supply point, refuelling points, and provisional supply points.

In the case of fuel reception and distribution, the supply platoon leader coordinates with the deputy commander in charge of supplies, in lieu of the chief of staff.

Tank and mechanized battalions normally have ten cargo (general purpose) trucks organic to them, and each truck generally pulls a trailer of almost equal lift tonnage.

The Soviets have structured their logistical forces in such a manner as to allow the tactical units a small "tooth to tail" ratio. It is now necessary to look at the materiel and maintenance procedures and capabilities of the Soviet rear services.

LOGISTICAL CAPABILITIES - MATERIEL AND MAINTENANCE SUPPORT

Supply Procedures

The "delivery forward concept" enables the tactical logistical system to be directly linked with the operational logistical network (front and army).¹⁵ The concept is designed to allow a higher headquarters, utilizing its own organic assets, to directly resupply the next two lower echelons. Therefore, army rear services (which may have one or more truck regiments of about 1000 trucks each) are designed to fulfill not only divisional supply requirements, but also to satisfy the regimental needs by directly supplying the regiments. Division rear services, in turn, can supply regimental and battalion requirements utilizing divisional assets. Rear services of the regiment can supply theoretically subunits down to company level. This type of delivery system can provide needed supplies directly to the combat vehicles (or in the case of artillery directly to the guns) or to the unit's reception supply station. Vehicle collection points are established at each unit to receive and guide higher level incoming resupply vehicles.

The delivery forward concept may be a viable method for the resupply of tactical units during peacetime or during training exercises, but there are several inherent problems with the system which could have a detrimental impact on the timely delivery of supplies during combat operations.

The Soviets have historically relied on road guides to direct supply trucks to the vehicle collection points or to the units. Since maps are a strictly controlled item in the Soviet army and not issued to the drivers of supply vehicles, it is highly unlikely that this policy has changed. Therefore, drivers from higher echelons are still dependent on road guides for directions. While this type of navigation may be adequate in the "secure" rear of some higher tactical units, road guides become increasingly vulnerable to enemy observation and interdiction the closer they are located to the FEBA (especially on the fluid and highly mobile battlefields envisaged during the next war). Once the combat zone has moved into West Germany, the Latin alphabet of roads and towns could further compound the navigational problems of the drivers. These problems, if exacerbated and exploited by NATO forces, could have a serious impact on the ability of the rear services to resupply tactical units in a timely manner.

Stockpiles, Dumps, and Depots

"The nature of the initial phase of modern war requires that the materiel means required for conducting the first operations not only be prepared in peacetime, but dispersed, taking into account the requirements of anti-atomic defense."¹⁶

The Soviet Union has classified reserves into four categories, each of which plays a vital role for the successful support of the war. These reserves are intended to sustain support operations until the country can be placed on a "war footing" production level.¹⁷

Two types of reserves that are to be utilized during the initial stages of the war are emergency and mobilization reserves. Emergency reserves can be kept directly with the deployed units or formations but are usually kept at army and front levels. These reserves are kept at levels commensurate with the expected tremendous loss of equipment and materiel in a nuclear war. If however, the war were to be conducted on a conventional level, then in theory, the losses would not be as great during the initial stages, and the "overage" of reserves would be a bonus. Mobilization reserves are designated for the rapid replenishment of the emergency reserves and are usually located in the western military districts of the Soviet Union.

The third type of stockpiled reserves are the strategic reserves and they are located throughout the Soviet Union and fall under the control of the Soviet High Command. The fourth category of reserves is classified as state reserves, which are under the control of the Soviet government.

Depots are located at army and front levels. Bulk items such as POL and containerized ammunition shipments are usually moved forward by rail as far as possible, thereby insuring a minimum loading/off loading time. The army forward depot is approximately 50 km from the FEBA and the army base depot approximately 100 km from the FEBA. The front depot is normally about 250 km from the FEBA and is connected to the mobilization and strategic stockpiles by rail and strategic pipelines.¹⁸

At division and regimental levels, mobile supply dumps are established approximately 30 km and 15 km respectively from the FEBA. Supplies are kept loaded on motor transportation as much as possible to insure rapid redeployment forward. Off loading is kept to a minimum and if done, the supplies are usually palletized.¹⁹

Primary Logistic Vehicles

Rail will be the prime transportation mode for the delivery of materiel, weapons, and equipment to the front from the Soviet Union. Rail, while having the ability to transport mass tonnage over long distances, becomes increasingly vulnerable the closer it approaches the FEBA, and the resupply of tactical units via rail is not a viable option, due to the high degree of mobility of the combat units on today's battlefield. Therefore, motor transportation begins to play the primary role of resupply of materiel from the front level on down.

The Soviet Union and the Warsaw Pact countries have placed a great deal of emphasis on improving their primary and secondary road network, not only for the obvious economic advantages, but also to give them access to inter-connecting hard surface roads during the war. However, the Soviets are fully aware that while hard surface roads will greatly enhance the speed of moving supplies forward, the majority of supply deliveries to tactical units will be off the road. They, therefore, have designed a fleet of trucks and prime movers that have excellent cross country capabilities.

The primary Soviet logistic vehicles are the ZIL 131, URAL 375D, URAL 377M, KRAZ 255B, MAZ 535, and the MAZ 537. The following data shows the lift capabilities of these vehicles:²⁰

<u>Capacity (tons)</u>		<u>with trailer</u>	<u>Range</u>	<u>Use</u>
	highway/cross country		km's	
ZIL 131	5/3.5	6.5/4	525	GP-prime mover 122mm gun
URAL 375D	4.5/4	10/5	650	GP-Div. level
URAL 377M	8/7.5	10.5/5.6	550	GP-Army & Front
KRAZ 255B	7.5/7.5	30/10	650	GP
MAZ 535	6/6	50/5	600	Heavy trans.
MAZ 537A	15/15	75/30	650	Tow hvy. arty.
MAZ 537D		65	650	Tank trans-porter

The MAZ 537D, tank transporter, has given the Soviet Ground Forces a heavy lift capability and has lessened their dependence on rail transportation in the movement of heavy loads or out-sized cargo. During the 1967 invasion of Czechoslovakia, the MAZ 537 played an important role in the movement of tanks forward. The Soviets believe in transporting tanks and other heavy weapons systems as close to the FEBA as possible before the tracks hit the ground.

In a mechanized rifle regiment, the rear services have a capacity to haul approximately 500 tons (in a tank regiment - 380 tons). In addition to its regimental lift, a division can carry about 1750 tons, i.e. a total lift capacity of 3700 tons for a mechanized division and 4300 for a tank division. Army rear services can carry approximately 5000 tons (considerably more if civilian transportation is utilized), thereby giving an army of three tank

divisions and one mechanized rifle division a minimum lift capacity of 19,000 tons. Front transportation would increase this total to 34,000 tons.²¹

Air Resupply

While the Soviets do not appear to place great reliance on air resupply of combat units, the Yom Kippur War of 1973 reflected that they do have the capacity and ability to airlift war materiel and resupply over long lines of communications. During the initial stages of the war, the Soviets airlifted more tonnage to the region than the United States did (this can be explained by the fact that the Soviets had shorter lines of communication than did the US, but at the end of the war the total amount of tonnage airlifted into the region was decidedly in the favor of the US). What is important is that the Soviets proved their capacity to airlift high tonnage over long distances. The three primary transport aircraft are the AN-12 (CUB) with a payload capacity of 44,090 lbs. (US equivalent C130, payload of 43,331), the IL-76 (CANDID) with a payload of 88,185 lbs. (roughly equal to the US C141, payload of 64,000 lbs.), and the AN-22 (COCK), payload of 176,350 lbs. (US equivalent is the C5A which carries a payload of 220,937 lbs.).

While helicopters have experienced a rapid development within the Soviet forces, it appears that they have not yet "mastered" the art of using helicopters within the combat zone for resupply. In a November 1978 article in Soviet Military Review, Col. M. Belov continually referred to the high degree of employment of air transportation in Western armies, and implied that the Soviets could learn much from their methods of utilization.²²

Ammunition Resupply

Ammunition is considered to be the number one priority item of supply. It is broken down into nuclear and conventional categories, with nuclear taking a higher priority.

Demands for resupply of ammunition are usually given in multiples of "units of fire" called "boyekomplpekt" (BK's). Each weapon and weapon system is allocated a unit of fire of "X" number of rounds, and all requests for resupply of ammunition will be given in multiples of the unit of fire of any particular weapon (i.e. the BK of the Sagger anti-tank missile is 6. If a unit needed 15 missiles they would request 2.5 BK's. These units of fire should not be confused with the Western term "basic load". Examples of "units of fire" of some of the more common weapons are as follows:²³

<u>Weapon</u>	<u>Quantity</u>
<u>Tanks</u>	
T-55	43
T-62	40
T-72	40
<u>Towed Artillery</u>	
122,130 mm	80
152 mm	60
122 mm mortar	90
<u>Anti-aircraft</u>	
ZSU 23/4	600
<u>Small Arms</u>	
AK	1000
PKM	1000
<u>Anti-tank</u>	
Sagger	6

The chief of artillery at division and regimental levels controls all the requisitioning and acceptance of ammunition. Each artillery commander sends an ammunition status report of his unit every 12 hours via artillery channels to the next higher echelon. These reports include the status of all types of ammunition (number of artillery rounds, tank rounds, small arms, Saggars, etc.). These reports are compiled and issuances are made based on:

1. The extent of the requesting unit's depletion
2. Stocks available at the issuing level
3. The supply stockage of the next higher level

Priority is given to the units which will play the most decisive role in the immediate future.

Fuel Resupply

"Under present day conditions, due to the complete motorization and the continuous increase in their technical equipment, the importance of fuels and lubricants in support of combat operations of troops has drastically increased. On the whole, fuels and lubricants may constitute more than 50% of the total volume of materiel means required by the Armed Forces.²⁴

In recent years, the Soviets have written extensively on the necessity of timely refuelling of combat vehicles.* The prospect of a successful high speed offensive coming to a sudden halt due to the lack of fuel has been of great concern to Soviet planners.

Fuel is brought to the front level via strategic underground pipelines. From fixed storage sites, fuel is transferred into rail tankers, vehicle fuel trucks, or large portable rubber reservoirs (these vary in sizes, but the most common are 2,500 litres, 5,000 litres, and 12,500 litres). These rubber containers may be ferried to the combat zone via helicopters, but the primary means of transport appears to be by truck.

The primary fuel tank vehicles are the MAZ 500 A/TZ 8-500 with a capacity of 8,000 litres and the KRAZ 3-255 B/TZ 8-255B with a capacity of 8,500 liters. Both of these vehicles have excellent cross country capabilities and are designed to refuel the consuming vehicles directly. Again, it is evident that the Soviets have developed a system that cuts critical loading/off loading time by having the ability to directly refuel combat vehicles near or in the combat zone.

However, resupply of fuel from front depots to the tactical units cannot rely solely on motor assets. "one front alone during the course of an offensive operation requires the delivery from the warehouse to the troops of up to 25,000 tons of fuel (approximately 20 million liters) per day. In order to deliver such a quantity of fuel over a distance of 300 kms, more than 10,000 5-ton trucks would be required.²⁵

The Soviets have helped to solve this problem by "using field pipelines as the troops advance."²⁶

Tactical Pipelines

Within the past five years much attention has been given by the Soviet press to the pipelaying troops. They fall under the operational control of the director of rear services. A pipelaying regiment is assigned at army level, and the regiment consists of three to four battalions of 350-400 men each and can lay up to 80 km of pipe per day. The battalions have troops responsible for constructing and guarding the pipeline, and technical personnel to supervise the construction and operations of the system.²⁷ These units are playing a vital role in Soviet training exercises and are

*Tactical units request fuel through "units of measurement" called zapravki or "fill". A "fill" is the amount of fuel necessary for a complete filling of the internal and external tanks of combat vehicle, or in the case of wheeled vehicles it is the amount of fuel necessary for a 500 km range at normal consumption rate.

trying to "perfect" a very temperamental system (i.e. the effects on the performance of the pipeline due to terrain, pollution, weather, etc.). "It is characteristic of pipelaying subunits to spend 3/4 of their time in the field."²⁸

The advantages of the utilization of tactical pipelines are apparent: when operating they fulfill a vital link in the supply chain by transporting up to 80,000 liters of fuel per hour over considerable distances with very little expenditure of men and equipment.²⁹ It also frees many of the 10,00 trucks referred to above and enables freer road access for other supplies.

The disadvantages of tactical pipelines are equally obvious: their operation and their efficiency can be dependent on natural hazards, accidents, and conventional, nuclear, or partisan action. If a section of pipeline is destroyed, the prospects of fuel loss or hazardous fires are ever present. It is also a fairly inflexible system once constructed.³⁰

The Soviets have determined that the advantages outweigh the disadvantages, and together with the other countries in the Warsaw Pact, have constructed a very efficient pipeline network within Eastern Europe.

While fuel and lubricants are the number two priority supply item, POL could well be the number one priority during certain phases of combat. Lessons learned from the Arab-Israeli wars not only showed the rapid expenditure rates of ammunition on today's battlefield, but also proved that fuels were consumed at an unprecedented rate (a number of Israeli tanks outran their supply lines during the '67 War and were temporarily stranded in the middle of the Sinai). Even though the terrain on which the Arab-Israeli wars were fought is more conducive to high speed operations, similar problems could occur in the European theater, especially during the pursuit phase. Tactical pipelines could play a vital role in the moving of fuel forward as close to the FEBA as possible, thereby insuring that adequate fuel supplies are on hand for the tactical units.

Ration Resupply

While ration supply is the lowest of the priorities, it still plays a vital role in the health and morale of the fighting men. Rations are allocated according to a "norm", and each soldier is allotted one kg. of dry/canned goods per day and two kg's. of fresh food per day.³¹ During a time of war, these amounts may decrease due to the low priority of rations.

Units submit their annual food requirements to the military districts or groups of forces every November, and the districts or

groups supply the units with foodstuffs based upon their requests. However, very rarely do units receive their entire requisitioned amount. Therefore, the Soviets have established working farms at each subunit level. These farms theoretically provide the difference between what is requested and what is received. If there is a further shortfall, then the subunits are authorized to locally procure goods on the economy. All units have cooks well versed in the preparation of unprepared foodstuffs- raw grain, cattle on hoof, etc. This could prove extremely important during combat operations when foraging in enemy areas becomes a necessity.

While rations are the lowest resupply item, the Soviets continually discuss the importance of supplying the troops with adequate rations. In an article by General of the Army S. Kurkotkin, Commander of Rear Services of the Soviet Army, there is an indication that the individual soldier is not receiving what he is authorized. He stated, "they (subunits) cannot tolerate losses of materiel resources, or a shortage in the distribution of foods."³²

A Soviet soldier, who recently defected to the West, alleges that a typical day's rations were considerably less than the authorized three kg's per day in the Group of Soviet Forces, Germany. He gave the following typical day's rations:

"For breakfast they receive porridge, usually cold, one kg. loaf of white bread for ten people and a small piece of butter 10-15 grams. The butter is old and rancid, and a piece so small that one only looks at it. The pot of porridge is for ten people and a portion is two spoonfuls. It is true one can ask for black bread.... For lunch one is due soup (hot water with a piece of cabbage floating in it) and a potatoe for ten people. The second course is one small ladle of buckwheat, barley, or oatmeal porridge. The porridge has a butter sauce, but the butter is not always present, and a small piece of fat is sometimes swimming in it..... For supper we received cold soup made the day before, and a piece of fish, often rotten. This fish is completely uneatable. Once they saw in the food worms crawling in it. They gave us this fish almost every day."³³

If the Soviet army cannot provide adequate rations to their troops during peacetime, the lack of sufficient rations during wartime could have a significant impact on the morale of the troops. To partially alleviate this problem, the Soviets have developed dry rations for issue. Although the troops are to receive a minimum one hot meal per day, dehydrated rations are to be used when the combat situations dictates. Another added advantage of dehydrated rations is their immunity (until opened) to radioactive contamination.

A number of new items of equipment for the preparation of food under field conditions have appeared recently in the Soviet

inventory. They have portable bakeries that can now bake bread on the move (PKhZ) and field kitchens which operate off the exhaust gasses of the GAZ 66D.

While there are many hurdles to overcome in the food service area, the main obstacle seems to be that the officers and NCO's do not make a concerted effort to improve the quality of the food to the serviceman and that wastages are high.³⁴

Medical Support

The Soviets do not normally employ rapid MEDEVAC techniques for the evacuation of casualties. The usage of helicopters for the primary mission of medical evacuation is still "envisaged".³⁵ The Soviets, therefore, endeavor to position their medical aid stations as close to the FEBA as possible or along likely avenues of evacuation. At the battalion level there is a paramedic assigned, and the first professional treatment (i.e. by a fully qualified doctor) a casualty receives is at regimental level. Lightly wounded personnel are returned to their units as soon as possible, and the more serious casualties are prepared for movement to the rear via empty supply trucks of higher headquarters.³⁶

The Soviets are well aware of the prospect of mass casualties that could occur on the nuclear battlefield, but they appear to have done little to expedite the removal of injured personnel from the combat zone. This is illustrated by the following passage: "The time for evacuation of wounded must not exceed 4-6 hours".³⁷ Since evacuation of wounded is normally dependent on the availability of higher units' logistical vehicles returning to the rear, this evacuation time could exceed the six hours, especially when there are mass casualties due to nuclear weapons. The almost absurd attitude toward adequate medical support and evacuation is reflected in the statement that medical treatment should be provided to the soldiers "without regard to what unit the personnel come from or what branch of service they belong to".³⁸

Maintenance

The Soviet maintenance program is considered austere by many Western military experts, but one should not interpret austerity as necessarily being inefficient. The Soviets have claimed that in some tactical units the deadline rate of motor transportation is only 2-3%.³⁹ This is an extremely (and almost unbelievable) low deadline rate by any Western standard.

The Soviets continually stress the importance of preventive maintenance and constant vehicle check by the operator during halts or rest periods. The individual driver of a combat vehicle

or truck should be a mechanic as well. Unlike many Western armies the vehicle operator in the Soviet army is authorized to perform certain second echelon maintenance functions. Simplicity in design and standardization have made the operator/mechanic's job easier, while at the same time probably extended the service life of the vehicle ("according to existing practical standards a vehicle must be operative for 10-12 years"⁴⁰).

The actual degree of efficiency in performing first and second echelon maintenance by the driver is, however, subject to question. The average Soviet truck driver is probably a two-year recruit with very little experience in driving or maintaining a vehicle (cars are still considered a luxury item in the Soviet Union). Therefore, the Soviets in all likelihood must train prospective vehicle operators at driver's schools during their initial period of induction. The quality of the graduates from these schools is questionable, as is pointed out in a recent Soviet publication:

"The training term of the group (student drivers) is drawing to a close. One week remains, but some students cannot drive a vehicle, and the rest have sat at the wheel only five or six times during training, although all hours covered by the program are noted as successful completions of masters of production training and in our individual practical class record books. We have complained, but everything remains the same as before".⁴¹

It is highly doubtful that when drivers report to their units after training they are proficient in vehicle maintenance if they hardly know how to operate a vehicle.

At battalion level, there is a battalion maintenance section. Its missions are to assist the drivers, perform repairs on damaged vehicles and, if unrepairable, prepare them for evacuation to the rear. Located in the rear of the battalion (normally about 5 km from the FEBA) the maintenance section stays in close contact with the Technical Observation Point (TOP), which is headed by the deputy commander in charge of supplies and maintenance. It is the mission of the personnel of the TOP to observe the conduct of the battle and immediately report to the maintenance section the location of any damaged vehicles on the battlefield, and to make an estimation on the nature and cause of the breakdown. Mechanics are then dispatched to the site and aid the driver in the repair of the vehicle.⁴²

Time for repair seems to play an important factor in the determination of whether a vehicle will be immediately repaired. "When on the march, the maintenance personnel only perform repairs which do not consume much time".⁴² If the mechanics determine that the vehicle cannot quickly be repaired (20-30 minutes), then action is taken to evacuate the vehicle to the rear, or if it is hindering the advance of the unit, the vehicle is towed or pushed to the side

to enable the remainder of the unit to advance. "Armored equipment is usually evacuated from the battlefield by recovery vehicles; guns and mortars by organic tracked vehicles of the artillery battery and mortar platoon; refuelling vehicles, field kitchens, infantry arms and other equipment by any incidental transportation means".⁴⁴

At regimental and divisional levels, more complex repair work is performed. At regimental level it appears that the Soviets have formed "specialized brigades of mechanics that concentrate on the repair of tanks. As a rule, they include the most experienced repairmen and other specialists of the regiment's armored service. They sometimes include the best trained soldiers from the companies".⁴⁵

Even though the Soviets are computerizing their repair parts requisitioning system, there appears to be some major problems in this field. There is very little open source literature on the exact requisitioning procedures, but there are indicators that units have to requisition many parts directly from the manufacturing plant.

One Soviet officer stated, "For example, right now there has been lying around in our shop for quite some time equipment on which representatives of a military unit requested priority repairs... (a small component part had to be obtained) from the plant which built the equipment. This is no simple matter, however, for the plant does not like this added aggravation, since we are not the only ones sending such requests to the plant".⁴⁶

The shortage of repair parts could be explained by the fact that the Soviet Army is basically inefficient in its methods of repair part resupply. However, the problem could be much greater. The stockage level of repair parts for equipment may not be based on actual usage. The Soviets may be basing their stockage levels of repair parts solely on the data received during the test development/prototype phases conducted at the manufacturing plant. In most Western armies, this method is used to establish the initial stockage level of repair parts, but the levels are subsequently modified periodically based upon field experience. There may not be any such modification within the Soviet repair parts field and, therefore, the levels of repair parts located in the units could be artificially low based on the lack of accurate usage rates from the field.⁴⁷

Another possible explanation for the lack of empirical data of required number of repair parts that should be on hand at unit level could be as a result of the fact that a large percentage of a Soviet soldier's equipment is kept in storage and not utilized by the troops during peacetime operations (this could also explain the low deadline rate). Thus, "the repair parts supply system is supporting an artificially low vehicle inventory even by peacetime standards, which may cause problems when the system must support the

full operation of the vehicle fleet."⁴⁸ From a maintenance standpoint, the storage of a high percentage of a unit's TO & E vehicles during peacetime could have significant ramifications during war. Personnel who are accustomed to maintaining a small percentage of a unit's equipment during peacetime, could experience extensive operational maintenance problems in supporting combat units at a full utilization level.

CONCLUSION

The Soviets have developed a very credible logistical system which supports their "principles of War". The strengths of the rear services of the Soviet army are readily apparent. The streamlining of the logistical tail of the tactical units has granted Soviet combat commanders a great deal of maneuverability and flexibility since it relieves them of the burden of cumbersome and slow moving trail units. They have placed the majority of logistical assets at the operational level, and have established a supply system by which higher headquarters supply the lower echelons utilizing operational level assets.

The Soviets are maintaining and continually up-grading their pre-positioned stocks at levels that will enable them to initiate and support a war with little last minute preparations. They have developed an extremely versatile fleet of ground transportation that can support tactical units under a variety of terrain conditions. Their employment of tactical pipelines has helped to solve the acute problem of efficient movement of POL from the operational rear to the tactical rear depots without overloading an anticipated congested road network. Even though technology is overtaking the ability of the Soviets to continually upgrade existing weapon systems, standardization of equipment still gives the Soviet forces a good degree of flexibility and has enabled the Warsaw Pact to be a mutually supportive alliance.

However, the Soviet logistical system is not without its shortcomings. The reliance of tactical units on higher headquarter's organic transportation to make timely deliveries of resupplies could create a number of problems for maneuver units during offensive operations. Since drivers do not have maps, will they be able to navigate in unfamiliar areas of operations, and will they have the ability to locate supported tactical units when they are deployed "off the road"? Is the strong dependence by the Soviets on road guides an antiquated method of traffic control and navigation in light of today's highly mobile battlefield?

The fact that a large percentage of combat equipment maintained in the tactical units is kept in storage (estimated at 70-75%) could have a detrimental impact during wartime. Since the Soviets only actively use 25-30% of their equipment for training, their POL and maintenance costs are lower than that of NATO's, but they may pay the price during the war. Do the Soviets have the capability to fully mobilize 100% of their line TO&E equipment in a quick and efficient manner? Do they have adequate repair parts on hand to support a fully activated inventory of equipment? Can maintenance personnel, who are used to supporting only a small portion of a unit's equipment during peacetime, be proficient enough to maintain a 100% inventory under extremely difficult

CONCLUSION (cont)

combat conditions? These are questions which can only be answered on the battlefield.

Even with the above questions unanswered, it appears that the Soviets have established a viable logistical system which reflects their recognition that inadequate logistical support can be a severely limiting factor in the successful conduct of a war.

FOOTNOTES

1. Speech presented by Mr. Christopher N. Donnelly at a joint U.S. Army Russian Institute/ University of Southern California Symposium, "New Perspectives on Soviet Foreign and Defense Policies", conducted at Garmisch, West Germany from 7-10 Dec. 1978.
2. Marshall V.D. Sokolovsky, ed., Military Strategy, 3rd ed., Translation, (Stanford Research Institute, Menlo Park, Ca.) Jan. 1971, p.360.
3. V. Ye. Savkin, Osnovnye Printsipy Operativnogo Iskusstva i Taktiki (Basic Principles of Operational Art and Tactics), (Moskva, 1972), p.334.
4. Graham Turbiville, "Soviet Logistic Support for Ground Operations". RUSI/RMAS Research Center for the Study of Soviet Affairs, (Sept. 1975), p.64.
5. Savkin, p.359.
6. Savkin, p.364
7. Dr. Keith A. Dunn, "Soviet Military Weaknesses and Vulnerabilities - A Critique of the Short War Advocates", (Carlisle Barracks, Pa. Strategic Studies Institute, 1978), pp.17-18.
8. Turbiville, p.68.
9. Turbiville, p.65
10. U.S. Department of the Army, USAITAD Report 14-U-76: Military Operations of the Soviet Army, (Washington D.C., 1 Sept. 1976) p.69.
11. Col. N. Malyugin, "Upravleniye Tylom Tankovogo Polka V Nastuplenii" (Control of the Rear Services of a Tank Regiment in the Offensive), Tyl i Snabzheniye Sovetskikh Vooruzhennykh Sil, Jan. 1977, p.31.
12. General-Major Yu. Ponomarev, "Upravleniye Tylom Polka Pri Nastuplenii V Vesokikh Tempakh" (Control of the Regimental Rear Services in a High Speed Offensive), Tyl i Snabzheniye Sovetskikh Vooruzhennykh Sil, July 1973, p.24.
13. I.I. Kushch, Tylovoye Obespecheniye Podrazdeleniya V Boyu, (Rear Service Support for Subunits in Combat), (Moskva, 1973), p.9.
14. Kushch, pp.12-13
15. Turbiville, p.65.

FOOTNOTES (cont.)

16. Sokolovsky, p.360.
17. Ibid.
18. Speech delivered by Mr. Christopher N. Donnelly to the U.S. Army War College, April 1978.
19. V.G. Reznichenko, Taktika, (Tactics), Translation (Foreign Technology Division, 4 Oct. 1967), p.103.
20. Headquarters, U.S. Army Europe, USAREUR Pam 30-60-1, Identification Handbook Guide, Part 2, Vol.1, 10 Oct. 1973
21. Donnelly, speech to the U.S. Army War College.
22. Col. M. Belov, "Logistics Air Mobility", Soviet Military Review, (Nov. 1978), pp.22-23.
23. Donnelly, speech to the U.S. Army War College.
24. Sokolovsky, p.361.
25. Ibid., pp.361-362.
26. Ibid., p.362.
27. Christopher N. Donnelly, "Soviet Tactical Pipelines", RUSI, (Jan. 1974), p.57.
28. LTC. V. Lvov, "Pipe Laying Operations", Soviet Military Review, (Dec. 1977), p.34.
29. Donnelly, "Soviet Tactical Pipelines", p.59
30. Ibid.
31. Donnelly, speech to the U.S. Army War College.
32. General of the Army S. Kurkotkin, "Vazhny Faktor Boyegotovnosti (An Important Factor in Combat Preparedness)", Krasnaya Zvezda, 22 Dec. 1978, p.2.
33. Igor Aleksashyk, "Polazheniye Sovetskikh Chastey V GDR" (Status of Soviet Units in the GDR), POSEV, No. 11, 1978, p.52.
34. Donnelly, speech to the U.S. Army War College.
35. Belov, p.23.

FOOTNOTES (cont.)

36. Col. N. Malyugin "Battalion Logistical Elements in the Offensive", Soviet Military Review, (July 1974, p.15.
37. General-Major P. Chobanov, "V Gornoy Mestnosti" (In Mountainous Terrain), Tyl i Snabzheniye Sovetskikh Voorushennykh Sil, (Dec. 1977), p.50.
38. Resnichenko, p.105.
39. I. Belykh, "Transport Chasti i ego ekspluatatsiya" (Transport Facilities of a Regiment and its Utilization), Tyl i Snabzheniye Sovetskikh Voorushennykh Sil, (March 1969), pp.71-75.
40. Col. V. Kashkovsky, "Protecting Vehicles Against Corrosion". Soviet Military Review, July 1977, p.18.
41. N. Malvletnev, "Nedostatke Stilya" (Flaws of Style), Sovetskiy Patriot, (15 Jan. 1978), p.3.
42. Kushch, pp.95-96.
43. LTC. B. Gruzdev, "Technical Service Trail Units", Soviet Military Review, (Dec. 1971), p.16.
44. Kushch, p.97.
45. Col. Ye. Babynin, "Vazhnoe Slagayemoye Boyegotovnosti" (An Important Element of Combat Readiness), Krasnaya Zvezda, (26 May 1978), p.1.
46. Lt. V. Ryasanov, "Ostry Signal - ne poslat" li Gontsa" (Acute signal How About Sending a Messenger), Krasnaya Zvezda, (7 May 1978), p.2.
47. General George S. Brown, USAF, United States Military Posture for FY 1979. (Washington D.C., U.S. Government Printing Office), p.93.

BIBLIOGRAPHY

BOOKS

1. Kratkyi Avtomobil'nyy Spravochnik, (Concise Automobile Manual), Moscow, 1971.
2. Kusch, L., Tylovoye Obespecheniye Podrazdeleniy V Boyu, (Rear Service Support for Subunits in Combat), Moscow, Transport, 1973.
3. Reznichenko, V., Taktika, (Tactics), Translation by Foreign Technology Division, 1967.
4. Savkin, V., Osnovnye Printsipy Operativnogo Iskysstva i Taktiki, (The Basic Principles of Operational Art and Tactics), Moscow, Ministerstva Oborony SSSR, 1972.
5. Sokolovsky, ed., Military Strategy, 3rd ed., Translation by Stanford Research Institute, Menlo Park, Ca., Jan. 1971.
6. Zalenskuy, D., Tekhnicheskoye Obespecheniye Tankovykh i Motorstrelkovykh Podrazdeleniy Sovremenom Boyu (Technical Support of Tank and Mechanized Subunits in Contemporary War), Moscow, Ministerstva Oborony SSSR, 1972.

JOURNALS

Tyl i Snabzheniye Sovetskikh Voorushennykh Sil:

1. Bazanov, L., "Diya Bepereboynogo Obespecheniya Voysk Goryuchim" (For Uninterrupted Gas Support for the Troops), #6, 1977
2. Belykh, L., "Transport Chasti i Ego Ekspluatatsiya" (Transportation of a Regiment and its Utilization), #3. 1969.
3. Chobanov, P. "V Gornoy Mestnosti: (In Mountainous Terrain), #12, 1977.
4. Dadev, L., "Podgotovka Medesinskogo Sostava Chasti", (The Preparation of Medical Personnel of Units), #9, 1978.
5. Drachev, M., "S Zabotoy Kachestve Pitaniya", (Care of the Quality of Food), #7, 1977.
6. Dyatlenko, V., "Komandir i Organizatsiya Zapravki Tekhniki Goryuchim", (Command and Organization of Gas Refuelling Techniques), #2, 1974.

JOURNALS (Cont.)

7. Evseenko, M., "Rabochaya Karta Zamestitelya Komandira Chasti Po Tylu", (Working Map of the Commander of Rear Services), #6, 1976.
8. Frolenkov, E., "Na Bol'shoye Rasstoyaniye", (At a Great Distance), #6, 1978.
9. Golyshko, L., "Tyl Vooruzhennykh Sil Za 60 Let", (The Rear Services of the Armed Forces for 60 Years), #2, 1978.
10. Gorognichev, V., "Obespecheniye Voysk Pole Zimoy", (Support of the Troops in the Field During Winter), #12, 1974.
11. Kapagin, N., "Razvitiye Sistemy Upravleniya Tylom Obschchevoyskovoy Armii (1940-1945)". (The Development of Rear Services Control of the Army (1940-1945), #10, 1978.
12. Khocheshko, G., "V Pole Po-Boyevomy", (In the Field As in Combat), #2, 1974.
13. Kleshchinov, K., "Nekotorye Voprosy Upravleniya Tylom", (Several Questions of Rear Service Control), #9, 1975.
14. Kornev, A., "O Mobilnosti Voyskovogo Tyla", (On the Mobility of the Combat Rear Services), #7, 1977.
15. Malyugin, N., "Tylovoye Obespecheniye Tankovogo Batal'ona V Nastuplenii S Forsirovaniyem Vodnoy Pregrady", (Rear Support of a Tank Battalion in an Offensive Water Crossing), #9, 1975.
16. Malyugin, N., "Upravleniye Tylom Tankovogo Polka Nastuplenii", (Control of the Rear Services of a Tank Regiment in the Offensive), #1, 1977.
17. Nikitin, V., "Ekonomiya Goryuchego", (Economy of Fuel"), #4, 1977.
18. Polosykhin, V., "V Interesakh Polevoy Vyuchki", (In the Interests of Field Training), #12, 1974.
19. Ponomarev, M., "Khoroshiy Kontrol'-Pomoshch' Rabote", (Good Control- An Aid in Work), #3, 1974.
20. Ponomarev, M., "O Tvorchestve i Initsiyative Ofitserov Tyla na Ucheniyakh", (About the Creative Thinking and Initiative of Rear Service Officers in Training), #3, 1974.
21. Salmanov, G., "Komandir i Podgotovka Tyla", (The Commander and the Preparation of the Rear), #1, 1973.

JOURNALS (Cont.)

22. Shchepetov, E., "Boyevoye Obespecheniye Podrazdeleniy Tyla", (Combat Support of the Rear Services of a Subunit), #3, 1978.
23. Sorochenko, L., "Tylovoye Obespecheniye Voysk Gorakh", (Rear Support of Forces in the Mountains), #9, 1977.
24. Sysoyev, P., "Ukrepiyat Sluzhbu Voysk Chastyakh i Uchrezhdeniyakh Tyla", (To Strengthen the Forces in Units and the Rear Services), #1, 1974.

RUSI/RMAS - Research Center for the Study of Soviet Affairs.

1. Donnelly, C.N., "Soviet Tactical Pipelines", Jan. 1974.
2. Erickson, J. "Soviet Breakthrough Operations: Resources and Restraints" Sept., 1976.
3. Erickson, J., "Soviet Military Capabilities in Europe", March, 1975.
4. Turbiville, G., "Soviet Logistic Support for Ground Operations", Sept., 1975.

Soviet Military Review

1. Belov, M., "Logistics Air Mobility", #11, 1978.
2. Gatilov, V., "Security for Logistical Support", #1, 1977.
3. Golushko, I., "Commander's Role in Controlling Logistics", #9, 1978.
4. Gruzdev, B., "Technical Service Trail Unit", #12, 1971.
5. Kashkoosky, V., "Protecting Vehicles Against Corrosion", #7, 1977.
6. Kushch, I., "Battalion Logistics Control", #12, 1978.
7. Lvov, V., "Pipelining Operations", #12, 1977.
8. Malyugin, N., "Battalion Logistical Elements in the Offensive", #7, 1974.
9. Malyugin, N., "Battalion Rear Elements on the Defensive", #7, 1975.

JOURNALS (Cont.)

POSEV

1. Aleksashyk, I., "Polezhneiye Sovetskikh Chastey V GDR", (Status of Soviet Units in the GDR), #11, 1978.

OTHER SOURCES

1. Brown, G., "United States Military Posture for FY 1979", (Washington, D.C.).
2. Babynin, Ye., "Vazhnoye Slagayemoye Boyegotovnosti", (An Important Element of Combat Readiness), Krasnaya Zvezda, 26 May 1978.
3. Donnelly, C.N., "Rear Support for the Soviet Ground Forces", speech delivered to the U.S. Army War College, Carlisle, Pa., April 1978.
4. Dunn, K., "Soviet Military Weakness and Vulnerabilities: A Critique of the Short War Advocates", Strategic Studies Institute, U.S. Army War College, Carlisle Barracks, Pa., 31 July 1978.
5. Volz, A., Professor, U.S. Army Russian Institute, Garmisch, FRG, Personal Interview, 15 Jan. 1979.
6. Joint U.S. Army Russian Institute?University of Southern California Symposium, "New Perspectives on the Soviet Foreign and Defensive Policies", conducted at Garmisch, FRG, from 7-10 Dec. 1978.
7. Kurkotkin, S., "Vazhnyy Faktor Boyegotovnosti", (An Important Factor in Combat Preparedness), Krasnaya Zvezda, 22 Dec. 1978.
8. Ryazanov, V., "Ostryy Signal - Ni Poslat' li Gontsa", (An Acute signal - How About Sending a Messenger), Krasnaya Zvezda, 7 May 1978.
9. U.S. Army Europe, USAREUR Pam. 30-60-1: Identification Handbook, Part Two, Headquarters, U.S. Army Europe, 30 June 1966.
10. U.S. Army Europe, USAREUR Pam. 30-60-1: Identification Guide, Part Two, Volume 11, Headquarters, U.S. Army Europe, 15 Feb. 1974.
11. U.S. Defense Intelligence Agency, Handbook on the Soviet Armed Forces, Washington, D.C., Feb. 1978.

OTHER SOURCES (cont.)

12. U.S. Department of the Army, USAITAD Report #14-U-76
Military Operations of the Soviet Army, Arlington, Va, 1976
13. XOC Seminar on Surprise Attack, Subject: "Soviet Surprise
Attack in Europe", Pentagon, Washington D.C., 18 March 1977.